

Amphibia, Anura, Cycloramphidae, *Proceratophrys avelinoi* Mercadal de Barrio and Barrio, 1993: Distribution extension and distribution map

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ABSTRACT: *Proceratophrys avelinoi* was only known from one reserve in Paraguay, located in the southern region of the country, in the Itapúa department. Herein we report the third record for the country which would be the first record for the department of Alto Parana department extending the distribution of this species in the country over 200 km; we also present the *P. avelinoi* distribution map in Paraguay.

Proceratophrys avelinoi is one of the four species included in the *P. biggibosa* species group, revised by Kwet and Faivovich (2001). The members of this group are characterized by the presence of postocular swellings and the absence of palpebral appendages, accompanied by cryptic, dorsal brownish coloration with red, orange, or tan colored ventral surface which is black spotted (Kwet and Baldo 2003), note many collection specimens loose their ventral coloration. *P. avelinoi* is a small sized member of this group (Table 1). This species can be identified by its small postocular swelling, light brown coloration on the suprascapular region, and orange reddish blotches on the venter (Figure 1). It is distinguished from *P. biggibosa* by the much smaller size, fainter postocular swelling; from *P. brauni* by the smaller size, rounded snout, and less-developed palpebral tubercles; from *P. palustris* because *P. avelinoi* has lighter coloration on the suprascapular region, better defined dorsal row of tubercles, and significantly smaller size in males (Kwet and Faivovich 2001).

Proceratophrys avelinoi is known from several localities in Misiones Province, Argentina; and in Londrina and Guarapuava municipality, state of Paraná, Brazil (Frost 2010). This species is one of the least known amphibians

in Paraguay, its presence was confirmed in 2006, and the known distribution was restricted to the southeastern portion of the country, in the department of Itapúa and is considered an Atlantic Forest endemic (Brusquetti and Lavilla 2006). Currently this species is categorized as "Least Concern" status for conservation, in the International Union for Conservation of Nature (IUCN) Red List (Lavilla *et al.* 2004). According to Motte *et al.* (2009), in Paraguay *P. avelinoi* is categorized as "Vulnerable"; because its habitat (Interior Atlantic Forest) is strongly threaten by human activities, and records include only one known locality.

On September 12, 2008, sampling was conducted within Limoy Biological Reserve, located in eastern most Paraguay (Figure 2), along the banks of the Parana River, in the Department of Alto Paraná; San Alberto district, approximately 24°45' S, 54°26' W. Limoy is a reserve which included approximately 16,000 ha of Interior Atlantic Forest. The specimen was collected using a 110 meter pitfall-trap with drift fence. The pitfall included eleven 20 liter buckets which were separated by 10 m each. The pitfall was run for eight consecutive nights. The buckets were filled to about one tenth of their sizes with water. After caught the specimen was sacrificed using 30 % alcohol,

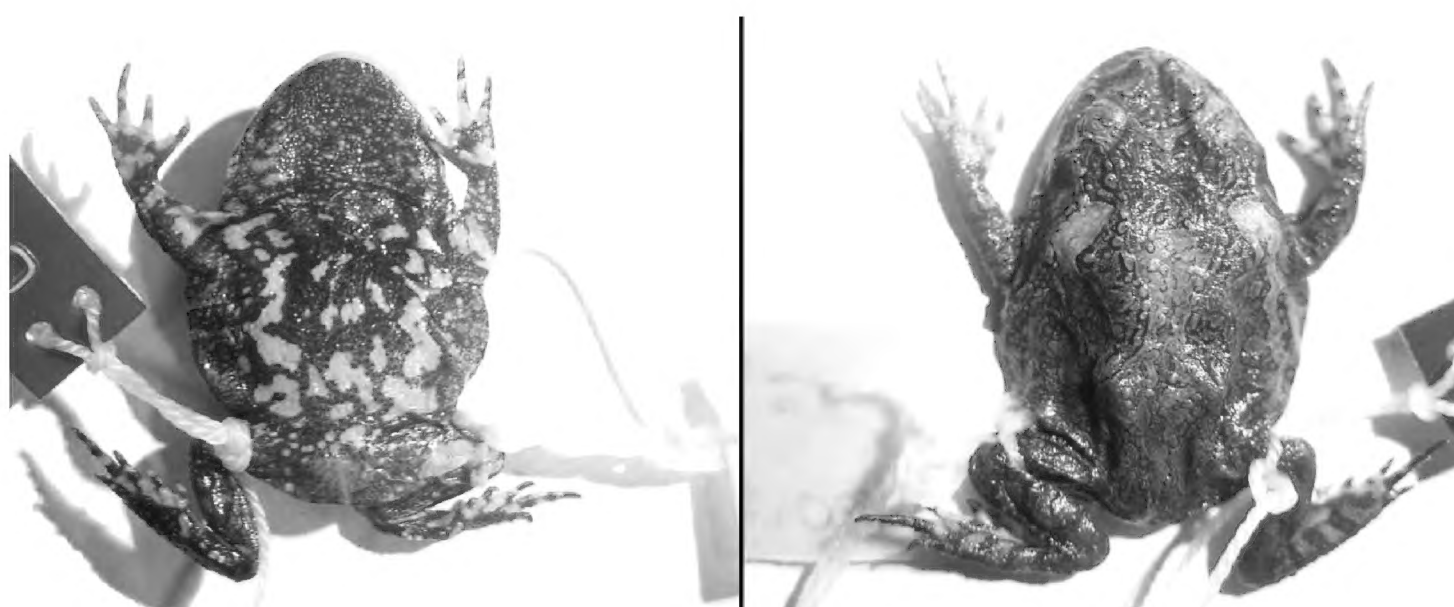


FIGURE 1. *Proceratophrys avelinoi* specimen CZ 0483 housed at the CZ FACEN; ventral view (left), dorsal view (right).

injected and covered with 10 % formalin as fixative, and deposited in 70 % alcohol for museum storage, according to Scrocchi and Kretzschmar (1996). Morphological measurements were taken using digital calipers to the nearest 0.1 mm following Kwet and Faivovich (2001). Specimens were collected under collecting permits from the Secretaría del Ambiente, Dirección de Vida Silvestre, Permiso de Caza o Colecta Científica No. 03/08.

The specimen was deposited in the Zoological Collection of the Facultad de Ciencias Exactas y Naturales (CZ 0483), Universidad Nacional de Asunción; located in San Lorenzo, Central Department, and represents the first specimen deposited in a Paraguayan scientific collection.

This record extends the know distribution in Paraguay more than 200 km northwards, and is the first record known outside of San Rafael Reserve and the first record in the Department of Alto Paraná. The specimen was collected in tall canopy forest with lush fern understory growth within the Interior Atlantic Forest bioregion as delimited by Olson et al. (2001).

The first known record for Paraguay is from specimens housed at the Museum of Zoology of the University of Michigan (UMMZ 166817-8), collected in 1972, in Department of Itapúa, 3.5 km E of San Rafael (Brusquetti and Lavilla 2006). More recently, 25/XI/2007, a new individual was reported from the Estación Ecológica de San Rafael (ECOSARA), 26°38'15" S, 55°39'40" W (Pier Cacciali personal communication), however, there was no voucher collected. Bertoni (1939) cited *Odontophrynus boiei* for Alto Paraná, probably based on specimens that correspond to *Proceratophrys avelinoi*, unfortunately there is no voucher material to verify its identity.

Noting the dramatic deforestation of the Interior Atlantic Forest of eastern Paraguay (Huang et al. 2007,

2009) records of forest fauna are extremely important in order to better understand the true complexity of these systems before they are irreplaceably loss.

TABLE 1. Measurements of *P. avelinoi* (CZ0483) based on Kwet and Faivovich (2001).

Measures (in millimeters)	
Snout-vent length	28.4
Head length	10.1
Head width	13.4
Eye diameter	2.4
Internarial distance	2.4
Tibia length	9.7
Foot length	10.8
Inner metatarsal tubercle length	1.4

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LITERATURE CITED

Bertoni, A.W. 1939. Catálogos Sistemáticos de los Vertebrados del Paraguay: Clase Tercera Batrachia. *Revista de la Sociedad Científica del Paraguay* 4 (4): 42-43.

Brusquetti, F. and E.O. Lavilla. 2006. Lista comentada de los anfibios de Paraguay. *Cuadernos de Herpetología* 20(2): 3-79.

Frost, D.R. 2010. *Proceratophrys avelinoi*. In: *Amphibian Species of the World: an Online Reference. Version 5.4* (8 April, 2010). Electronic Database accessible at <http://research.amnh.org/vz/herpetology/amphibia/>. Captured on 10 April, 2010.

Huang, C., S. Kim, A. Altstatt, J.R.G. Townshend, P. Davis, K. Song, C.J. Tucker, O. Rodas, A. Yanosky, R. Clay and J. Musinsky. 2007. Rapid loss of Paraguay's Atlantic forest and the status of protected areas – A Landsat assessment. *Remote Sensing of Environment* 106: 460-466.

Huang, C., S. Kim, K. Song, J. R.G. Townshend, P. Davis, A. Altstatt, O. Rodas, A. Yanosky, R. Clay, C. J. Tucker and J. Musinsky. 2009. Assessment of Paraguay's forest cover change using Landsat observations. *Global and Planetary Change* 67: 1-12.

Kwet, A. and D. Baldo. 2003. Advertisement call of the leptodactylid frog *Proceratophrys avelinoi*. *Amphibia-Reptilia* 24: 104-107

Kwet, A. and J. Faivovich. 2001. *Proceratophrys bigibbosa* species group (Anura: Leptodactylidae), with description of a new species. *Copeia* (1): 203-215.

Lavilla, E., A. Kwet, P. García and J. Faivovich. 2004. *Proceratophrys avelinoi*. In: IUCN 2009. *IUCN Red List of Threatened Species. Version 2009*. Database accesible at <http://www.iucnredlist.org/details/57294/0>. Captured on 31 August, 2009.

Motte, M., K. Núñez, P. Cacciali, F. Brusquetti, N. Scott and A.L. Aquino. 2009. Categorización del estado de conservación de los anfibios y reptiles de Paraguay. *Cuadernos de Herpetología* 23(1): 5-18.

Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underwood, J.A. D'Amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettengel, P. Hedao and K.R. Kassem. 2001. Terrestrial ecoregions of the world: a new map of life on Earth. *Bioscience* 51: 933-938.

Scrocchi, G. and S. Kretzschmar. 1996. Guía de métodos de captura y preparación de anfibios y reptiles para estudios científicos y manejo de colecciones herpetológicas. *Miscelánea* 102 (1996): 2-44.

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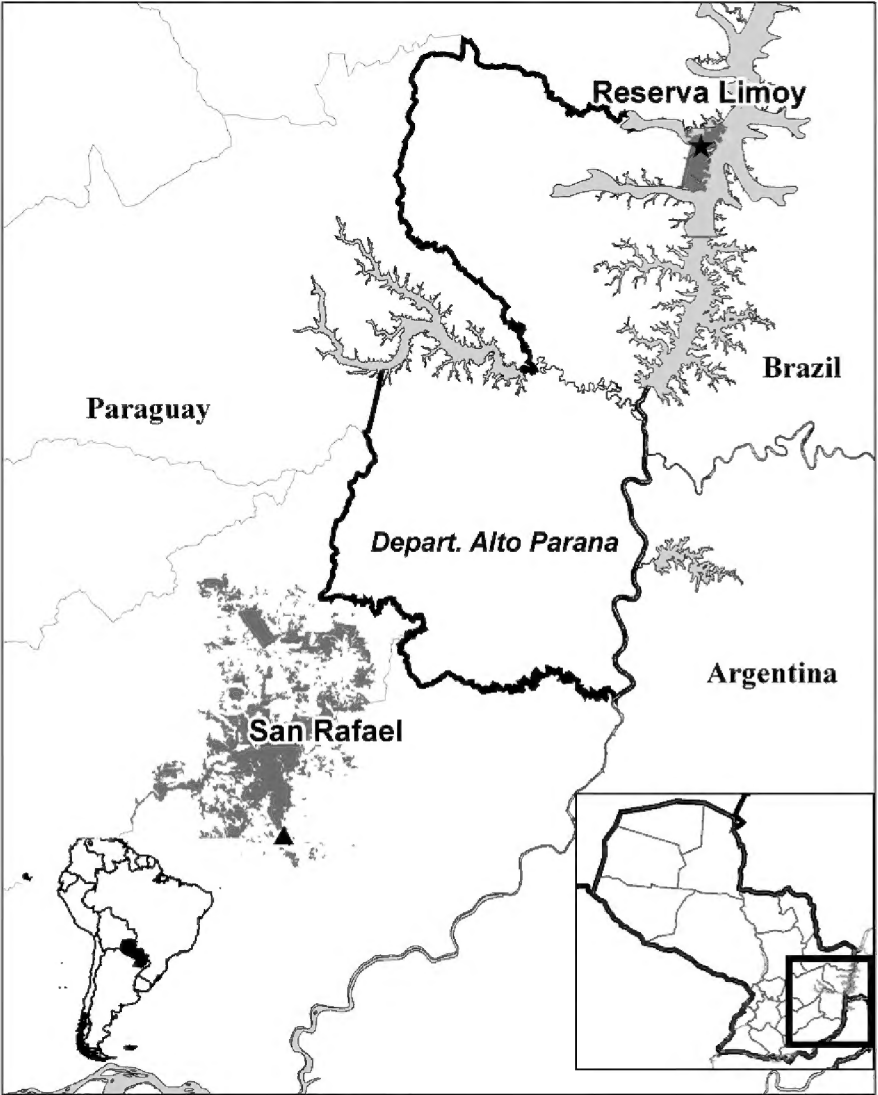


FIGURE 2. Distribution map of *P. avelinoi*, in Paraguay highlighting the forest reserves which have been documented to harbor this species San Rafael (ECOSARA), 26°38'15" S, 55°39'40" W (solid triangle) and Limoy this publication (solid star). (Brusquetti and Lavilla 2006; Cacciali pers. com.).